

University of Bahrain
College of Information Technology
Department of Computer Science
ITCS 341: Object Oriented Systems
Semester II, 2004-2005

Test #1

Date: 24/04/2005

Time: 11:30-12:45

Question 1 (30 Points)

Read the statement of the problem below and answer the following questions:

The University Hotel has many rooms. Each room has a room number and can be booked by one guest at a time.

Each guest has a unique CPR number and a name. Any guest can book many rooms at one time.

The room booking process is initiated and controlled by the guest. A guest can book a room, change a room, and cancel booking a room.

Any guest should know all the rooms that he/she booked. Any room should know the guest that has booked the room.

- 1) What is the relationship between the classes Guest and Room? Draw a diagram showing the relationship?
- 2) What is the cardinality of the classes in the relationship between the classes Guest and Room?
- 3) Add to both classes Guest and Room below, all the attributes that maintain the relationship between the two classes.
- 4) Complete in both classes Guest and Room below, the methods that support the operations booking a room and change a booked room to another room. The methods that need to be completed are shown in bold.

```
class Room
{
    private int roomNumber;
    .....
    public Room(int num)
    {
        .....
    }
    public int getRoomNumber()
    {
        return roomNumber;
    }
}
```

```

//continue class Room
public boolean equals(Room r)
{
    if ((this.roomNumber)==(r.getRoomNumber()))
        return true;
    else
        return false;
}
public void book(....)
{
    .....
}
public void freeRoom(.....)
{
    .....
}
} // End class Room
class Guest
{
    private String CPR;
    private String name;
    .....
    public Guest(String c, String n)
    {
        .....
    }
    public void bookRoom(.....)
    {
        .....
    }
    public void changeRoom(.....)
    {
        .....
    }
    public String getCPR()
    {
        return CPR;
    }
    public void displayBookedRoomsList()
    {
        for(int i=0; i<next; i++)
            System.out.println(roomList[i].getRoomNumber());
    }
} //End class Guest

```

Question 2 (10)

Read the statement of the problem below and answer the following questions:

A chandelier consists of a main chandelier holder, eight crystals holders, eight bulbs holders, and eight bulbs. The crystals holder consists of 50 crystals.

The bulbs can be replaced by new bulbs when they are expired.

- 1) Draw a class diagram that shows the main class and relationships between the classes.
- 2) Specify the type of the aggregation if any

Question 3 (10)

The following questions are related to the classes below:

- 1) Draw the object diagram that is resulted from executing the statement below which is included in the main method of class Test:

`Beetle myBeetle = new Beetle("Beetee", "red", "black", 2);`
- 2) Show the effect of the messages in the object diagram resulted of the statement in main:

`System.out.println(myBeetle.getEyeColor());`
- 3) What is the name of the concept that occurred when executing `myBeetle.getEyeColor();`

```
public class Test
{
    public static void main (String args [])
    {
        Beetle myBeetle = new Beetle("Beetee", "red", "black", 2);
        System.out.println(myBeetle.getEyeColor());
    }
} //End class Test
```

```

class Beetle
{
    private String name;      private String color;
    private Head head;  private Body body;
    private Leg legs[];
    public Beetle(String n, String color, String eyecolor,
                  int length)
    {
        name=n;          this.color=color;
        head = new Head(eyecolor);
        body = new Body();
        legs = new Leg[4];
        for (int i=0; i<4; i++)
            legs[i] = new Leg(length);
    }
    public String getEyeColor()
    {
        return    head.getEyeColor(); }
    public String getColor()
    {
        return color; }
    public int getLegLength()
    {
        return legs[0].getLength(); }
} //End of class Beetle
class Head
{
    private Eye eye1;  private Eye eye2;
    public Head(String eyecolor)
    {
        eye1 = new Eye(eyecolor);
        eye2 = new Eye(eyecolor);
    }
    public String getEyeColor()
    {
        return eye1.getColor(); }
} //End class Head
class Body
{
    public Body()
    {
    }
} //End of class Body
class Leg
{
    private int length;
    public Leg(int length)
    {
        this.length=length; }
    public int getLength()
    {
        return length; }
} //End of class Leg
class Eye
{
    private String color;
    public Eye (String c)
    {
        color=c; }
    public String getColor()
    {
        return color; }
}

```